Discussion Draft for Public Comment

West Coast Governors' Global Warming Initiative

Emission Reductions at Marine Ports

Working Group 2 Report
April 13, 2004

Commitment Statement

The three states are committed to initiating joint efforts to reduce greenhouse gas ("GHG") emissions through reductions in the use of diesel generators on ships at West Coast ports. To the greatest extent possible, the three states will work in coordination with British Columbia and Canadian authorities to realize the benefits from recommended strategies. Recommended activities include:

- Reducing electrical power generated by using onboard diesel engines while marine vessels are docked by substituting power produced by on-shore facilities.
- Promoting additional measures to reduce ship emissions by improving fuel quality used by ships when in-port or in-transit along the Pacific Coast.
- Maximizing the reductions of health-threatening pollutants, such as diesel particulate matter ("diesel PM") and smog-forming oxides of nitrogen ("NOx"), which are significant co-benefits to measures that reduce GHG emissions from ships.
- Ensuring that compatible programs are pursued at major West Coast ports.

Background

Ship emissions of toxic diesel PM, smog-forming NOx, and GHGs are significant contributors to pollution problems on the West Coast. Because they consume large amounts of petroleum-based fuels, ships account for roughly two to four percent of global emissions of carbon dioxide ("CO_2") and roughly five percent of the U.S. emissions from the transportation sector. While in port, ships typically use large diesel engines to generate onboard electricity; and large ships can use several megawatts of power while docked.

Several Pacific Coast ports employ or are exploring the development of facilities that would allow ships to use power from the on-shore electrical grid while they are docked. Land-based electricity generation along the West Coast results in at least two-thirds lower GHG emissions from CO_2 compared to electrical power provided by onboard diesel engines. In addition, shore-produced power virtually eliminates local NOx and diesel PM emissions when compared to onboard generators.

In addition to promoting the expansion of port electrification, this effort will also assess a host of other measures to reduce emissions of GHGs, diesel PM, and smog-forming emissions at the ports and along the Pacific Coast shipping corridors. In addition to the core measure of port electrification for ships at dock, other areas to be considered include:

(1) The use of cleaner, on-road diesel fuels for local vessels (tugs, crew boats, etc.);

(2) The use of cleaner distillate diesel fuel (instead of bunker residual fuel) in ship auxiliary generators during hotelling operations;
(3) The creation of a sulfur emission control area under the International Maritime Organization that would require the use of lower sulfur residual fuel oil while ships are in coastal waters; and,
(4) Programs to lower speeds for ships approaching ports.

As time and resources permit, this effort will also explore how these same emissions might be reduced from the large numbers of diesel engines that operate at the ports to transfer cargo within the port and to move cargo from the ports to final destinations.

In combination these measures could significantly reduce the impact that port operations have on regional air quality and could provide meaningful reductions in the GHG emissions from fuel combustion by ships in the vicinity of West Coast ports.

To achieve the pollution benefits of on-shore power, "hook up" facilities must be added at the port, and shipboard electrical systems must be modified to enable them to be "plugged in." These modifications are relatively costly. For example, it is estimated that providing an existing dockside facility that can allow ships to hookup to shore power will cost in the range of $1.5 million to more than $5 million to install. Retrofitting existing ships to accept shore power is expected to cost in the range of $300,000 to more than $500,000 per ship retrofitted.

Equipping port facilities or ships with the needed capabilities at the time they are constructed may be much less expensive. Therefore, it makes sense to target initial efforts on expanding port facilities and on ships that are frequent visitors to West Coast ports; and, it is essential to employ compatible hookup technologies at the ports and on the ships.

Another cost will be the differential between the cost of power from the local electricity providers and the cost of onboard generation. Preliminary estimates suggest that the cost of power per kilowatt-hour at standard rates now charged along the West Coast will be at least one-and-one-half to three times more expensive than using bunker fuel to operate onboard generation.

Many ships that supply Pacific routes use West Coast ports on a routine basis and will often visit more than one port on each visit. These ships are the prime candidates for port electrification, because the pollution reduction benefits can be maximized per dollar invested. New facilities and new ships using those facilities are also primary candidates because of relatively lower costs. Conversely, a far larger number of ships visit Pacific Coast ports only infrequently and are not good candidates for port electrification.

There are several existing and planned examples of port electrification at West Coast ports. Princess Cruise Lines has outfitted eight ships to accept shore power, and these vessels routinely use shore power when they dock in Juneau, Alaska. Navy ships in San Diego and San Francisco also use port electrification, as do four cargo ships at the Pittsburg terminal near the San Francisco Bay. Projects are underway to add electrification facilities at the Ports of Los Angeles and Seattle. Canadian agencies have undertaken studies of emission reduction options, including port electrification, for marine vessels. They are also undertaking analyses of various

policy/management options for addressing marine vessel emissions. While this work is still underway and conclusions have not been drawn, this presents another opportunity to coordinate efforts among all West Coast ports.

Options Under Consideration

- Develop technical information and a cooperative framework to define more fully the costs and benefits of port electrification and other fuel related measures.
- Establish a joint technical effort to assure that port electrification and related projects are compatible from port to port.
- Develop a plan to expand the availability/use of port electrification and other measures at West Coast ports.
- Initiate informational efforts to inform the ports, shippers and the public of the benefits, costs and methods for port electrification and related measures.
- Determine how to provide incentives or other support to demonstration projects in each state.
- Encourage port operators to implement port electrification on a small, but growing scale.

Pros and Cons of Each Option

In general, while port electrification will be effective in reducing GHGs from ships berthed at a dock, it will have no effect on ships while at anchor in the harbor. It will also be difficult to warrant installation of shore power connectivity on ships that do not visit West Coast ports regularly. Accordingly, a broader approach that looks at how cleaner fuels or operational changes might concurrently reduce air pollutant and GHG emissions is being pursued.

Coordination among all West Coast ports, including British Columbia, will be the key to a successful outcome. Although coordination will be challenging, compared to other maritime shipping areas in North America, the limited number of ports and jurisdictions on the West Coast will make this effort relatively easier.

A collaborative, coordinated approach will require a substantial commitment of staff resources to implement, but will result in a high probability that major issues will be satisfactorily addressed. Financial constraints will be a compelling consideration, but the three states, along with the province of British Columbia, would be in a strong position to compete for funds at the federal level to underwrite demonstration projects. Each state will also be able to bring state-based incentives to support the project. Finally, it is recognized that there will likely be a significant net cost to implement these measures, and that the reduction in GHG emissions, on its own, is unlikely to justify these costs. However, the concurrent reductions in air pollution emissions that could be achieved are very significant, and they provide much needed pollution reductions that could well justify a switch to cleaner energy sources.

Regional Approach/Considerations

Technically, it is essential the port electrification be done in a coordinated manner at West Coast ports so that ships are capable of using the facilities at each port. Because shippers often have a choice of which West Coast port to use, it is desirable that each port follow similar approaches.

Political Considerations

- An early deliverable that could build momentum for pursuing further action would be to secure an international agreement on electrical hookup standards.
- It is critical that state-level policy makers agree on a common approach and agree that the GHG and pollution reduction benefits that port electrification can generate are worth the increased costs.
- Ports and operators can be expected to question the rationale and the benefit/cost ratio for port electrification, while environmental groups active in climate change, air quality, and public health could be expected to be supporters.
- Port operators will need to agree that port electrification is both feasible and worthwhile and that they will pursue similar approaches to implementing this strategy. Support from this group will be the key to achieving success from any recommended strategy.
- Shippers and vessel owners are the likeliest groups to oppose any further efforts to reduce emission impacts from commercial marine vessels; and, their opposition could be substantial and likely directed at breaking up an otherwise united front.
- Support for many of the options would be increased with the availability of financial and tax incentives, whereas opposition is more likely to be enhanced by mandated approaches.
- As the project develops, careful consideration should remain focused on maintaining a coordinated and unified approach among multiple jurisdictions. This would be an important consideration for virtually any of the approaches proposed.

Fiscal or Legislative Implications

- Port electrification will likely increase power costs for shippers and will require capital investments by owners of port facilities and ship owners. Using cleaner fuels or making operational changes will likely increase operating costs, but should avoid the need for significant capital investments. It will be necessary to determine the magnitude of the costs and how they will be paid for (via incentives or by affected parties).
- If incentives are to be provided, it will be necessary to identify funding sources, and may be necessary to gain legislative authorization from the participating states.

Possible Recommended Actions

- Explore port electrification concurrently with cleaner fuel and operational measures and fully consider the benefits that measures could have relative to both GHG emissions reductions and air pollution improvements.
- Establish a joint technical effort to assure that port electrification and related projects are compatible from port to port.
- Initiate informational efforts to inform the ports, shippers and the public of the benefits, costs and methods for port electrification and related measures.
- Encourage port operators to begin to implement port electrification and to expand efforts to use cleaner fuels to reduce ship emissions.